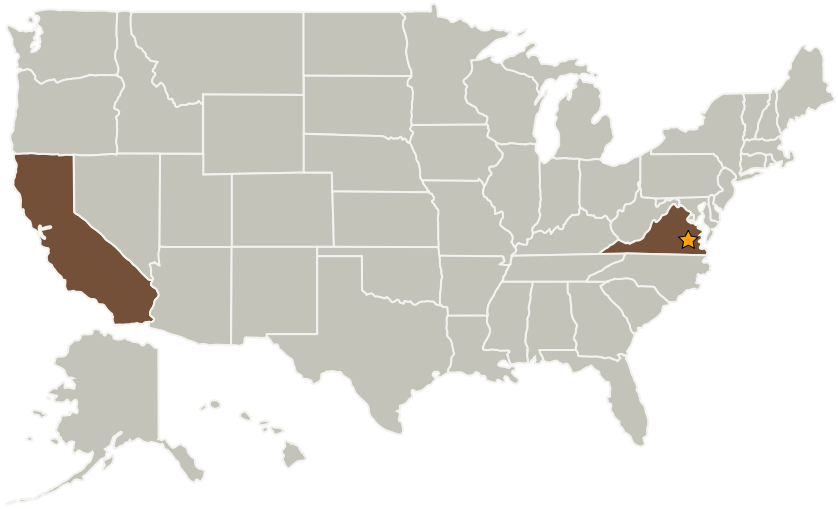
High Accuracy, Miniature Pressure Sensor for Very High Temperatures, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

SiWave proposes to develop a compact, low-cost MEMS-based pressure sensor for very high temperatures and low pressures in hypersonic wind tunnels. Most currently available pressure sensors use a micromachined diaphragm whose deflection is dependent on pressure. The deflection is typically measured by techniques that are not suited for high temperature (>~200?F) operation, or that are insensitive to small (<~0.1 psi) pressure changes. As a result, no commercial sensors cover 0-5 PSI at temperatures above 200?F, despite the fact that this regime is important for NASA?s hypersonic wind tunnel testing programs, as well as for hypersonic flight avionics. SiWave?s proposed pressure sensor is a novel implementation of squeeze film resonant sensor approach, with a sophisticated multi-element resonator designed for very high Q and temperature stability, made from silicon carbide. The device is controlled by distant external electronics. These innovative features result in a sensor with high accuracy (0.005 PSI) over an unprecedented temperature range (up to 650?F), and the potential to be manufactured in dense arrays.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Siwave, Inc.	Supporting Organization	Industry	Arcadia, California

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Darrell Harrington

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors